US-PAT-NO: 6083623

DOCUMENT-IDENTIFIER: US 6083623 A

TITLE: Bonding of solid lignocellulosic materials

---------- KWIC ---------

Abstract Text - ABTX (1):

Consolidated or composite lignocellulosic products such as **fiberboard,** particle **board, chipboard, waferboard,** plywood, straw composites, etc. are formed by using a particulate binder or adhesive constituting particles of crude cellulose polysaccharide materials, e.g. wood flour or ground straw, coated with MDI or other isocyanate binder in a thickness preferably in the range of 1-7 .mu.m.

Brief Summary Text - BSTX (30):

The source of the crude cellulose polysaccharide particles used in accordance with the present invention are bodies of plants, the major components of which are cellulose and hemicellulose. The stalks of a wide variety of plants can be used to provide the crude powdered cellulose polysaccharide material used in the present invention as all stalks of plants are composed basically of cellulose polysaccharide with a variety of other non-cellulose constituents. If the stalk of the plant in question contains at least 40% cellulose polysaccharide and less than 90% cellulose, it can be dried and used to form the crude cellulose polysaccharide powder of the present invention. Examples of such suitable materials are wood, wheat **straw,** rice **straw,** corn **straw, hemp** (if it becomes legal in the USA to use same), dried **grass,** rice hulls, **bagasse,** flax, stalks of other plants such as soya, cotton including recycled and shredded cotton fabrics, shredded regenerated cellulose **fibers** and fabrics such as rayon, shredded paper, etc. As indicated above, two good examples are wood flour and ground **straw** because they are plentiful and inexpensive. Substances which are associated with cellulose polysaccharides in plants, such as various gums, tanins, lignins, etc., usually do not interfere with surface activation by MDI.

US-PAT-NO: 5656129

DOCUMENT-IDENTIFIER: US 5656129 A

TITLE: Method of producing fibers from a straw and **board** products made therefrom

---------- KWIC ---------

Abstract Text - ABTX (1):

A method of refining wheat straw into fibers cuts the straw to a length of between about two and about four inches, wets the straw, softens the straw by subjecting the straw to pressurized steam and refines the softened straw in a pressurized mechanical refiner to produce fibers capable of being used in the manufacture of cellulosic **board** products. The straw fibers may be combined in any proportion to other fibers, such as wood fibers, and used in known dry, wet-dry, and wet **board** manufacturing processes to produce **softboard,** medium-density **fiberboard, and hardboard** products.

TITLE - TI (1):

Method of producing fibers from a straw and **board** products made therefrom

Detailed Description Text - DETX (17):

In the process of developing board products, the **straw fiber** may be combined in any desired proportion to **fiber** developed from one or more other sources of **fiber** including, but not limited to, wood chips and other wood products, waste paper, and **fibrous** plants like rice, jute, and **hemp**. The straw fiber and other fiber combination may also be used according to any suitable method to produce cellulosic materials. If such a fiber combination is used in a wet process, it is preferable to mix the different types of fibers consistently throughout the slurry used in that process, i.e., to assure that the fibers are evenly blended. This mixing may be accomplished through the use of a cyclone agitator that mixes the straw fibers and the other fibers with water until the fiber content of the mixture is, e.g., about 4 wt.%. The agitator vigorously agitates this mixture to blend the fibers evenly throughout the mixture and delivers the blended fiber/water mixture to the chest 24.

US-PAT-NO: 4913773

DOCUMENT-IDENTIFIER: US 4913773 A

TITLE: Method of manufacture of **paperboard**

---------- KWIC ---------

Abstract Text - ABTX (1):

A method of producing a multi-ply **paperboard** comprising at least one ply high bulk fibers sandwiched between at least two plies of conventional papermaking fibers. In a preferred embodiment, high bulk fibers characterized by twists, kinks and curls are produced by mechanical deformation without substantial fibrillation or breakage of the fibers, as by dry hammermilling or wet milling of the fibers. An aqueous foam furnish is preferred for laying the ply containing high bulk fibers.

TITLE - TI (1):

Method of manufacture of **paperboard**

Detailed Description Text - DETX (1):

In the production of paperboard by the process of this invention, fibers heretofore used in the manufacture of paperboard may be employed. Typically, conventional **fibers** are natural cellulosic **fibers** and include those obtained from wood pulp, cotton, **hemp, bagasse, straw,** flax and other plant sources, wood pulp being the most common. The wood pulp fibers can be derived from either hardwood or softwood pulps, and generally have fiber lengths ranging from about 1.0 to 6.0 mm. The pulps may be obtained by any of the conventional processes for preparing the fibers, for example, groundwood, cold soda, sulfite, or sulfate pulps, and may be bleached or unbleached.

US-PAT-NO: 4221751

DOCUMENT-IDENTIFIER: US 4221751 A

TITLE: Articles molded from papermill sludge

---------- KWIC ---------

Abstract Text - ABTX (1):

An article, such as a pallet having a substantially flat deck member and a plurality of hollow legs projecting from the deck member, is molded as a one-piece unit from a papermill sludge. Dried, comminuted papermill sludge is blended with a fibrous reinforcing material, preferably a cellulosic material such as fibrous bark particles, and a resinous particle **board** binder, the resulting mixture of furnish is formed into a loosely fitted mat, and the mat is placed between dyes of a mold and press and compressed to substantially the desired shape under temperature and pressure conditions sufficient to bond the sludge and bark particles together.

Detailed Description Text - DETX (6):

The fibrous reinforcing material includes natural and synthetic materials in fiber or stand-like form. To minimize cost, the fibrous reinforcing material preferably is a waste or scrap material, particularly waste wood products from lumber manufacture and wood pulping operations, such as bark, shavings, veneer and pulp chips, wood pulp, flakes, and the like. Other suitable **fibrous** reinforcing materials include other tree components, such as leaves, evergreen needles, etc. and other cellulosic materials such as scrap paper and paperboard, rags, **straw,** corn stalks, **hemp,** flax, jute and the like. Generally, natural or processed cellulosic materials are preferred. Bark is particularly suitable and the process will be described with bark being used as a fibrous reinforcing material. The composition of the furnish and general process parameters discussed below are applicable to other reinforcing materials.

US-PAT-NO: 3927235

DOCUMENT-IDENTIFIER: US 3927235 A

TITLE: Reconstituted **board** products from plant-fiber residues

---------- KWIC ---------

TITLE - TI (1):
Reconstituted **board** products from plant-fiber residues

Brief Summary Text - BSTX (10):
In accordance with the present invention, the above and other objects were found surprisingly to be satisfied by a particular application in particleboard preparation of certain fibers heretofore produced as by-products and considered to be nuisance wastes and residues in the processing of plants for other products, such as for wood, fruits, nuts, grains, extracts, and the like. More specifically, those waste fibers found useful in the present invention are those woody fibers which are found in plants in regions thereof extraneous to and removed from the main stalk or supporting member of the plant. Such non-stalk woody fibers, for example, include those found in plants in an outer coating for the supporting stalk of the plant, such as in tree bark; in foliage on a plant stalk, such as in leaves and needles; and in coatings or supporting structure for seeds, such as in shells, hulls, husks, pits, and the like, e.g., peanut shells, date pits, rice hulls, sunflower seed husks, corn cobs, and coffee bean solids (i.e., coffee grounds). For the purposes of this description, such woody fibers are called "exo-stalk plant fibers" or "exo-s-plant fibers", and it is to be understood that such terms when used herein are intended to refer to the above described type of woody fibers, in contrast to "stalk plant fibers" or as they are sometimes referred to herein, "s-plant fibers". S-plant **fibers** include, for example, **fibers** found in sawed boards from trees, corn stalks, **bagasse, hemp,** cotton stalk, kenaf stalk and the like.

US-PAT-NO: 3870665

DOCUMENT-IDENTIFIER: US 3870665 A

TITLE: Process for making pressure molded lignocellulose articles comprising isocyanurate group forming mold release agent

---------- KWIC ---------

Abstract Text - ABTX (1):

Plywood, **fiberboard** and other compression molded articles are prepared by compression molding wood chips or other lignocellulose material with an organic polyisocyanate and a catalyst which promotes reaction of isocyanato groups to form isocyanurates.

Brief Summary Text - BSTX (23):

The following lignocellulose-containing materials may be produced by the process according to the invention without the mold release agents or separating processes normally required when isocyanate binders are used: 1. Boards or moldings made of lignocellulose-containing material in the form of powders, **fibers,** chips or granules such as size reduced wood or **straw,** flax, sisal, **hemp,** sugarcane **bagasse,** savana **grass,** bamboo, peanut shells, rice husks and cork scrap. The lignocellulose material is first mixed in the usual manner with about 1 percent to 100 percent by weight (based on dry substance) of the isocyanate based binder or impregnating agent. As already mentioned above, the mold release agent may be added either at the same time as the binder or separately, optionally with the addition of solvents. It is preferred to use mixtures of polyisocyanates and mold release agents according to the invention which can be stored at room temperature. In a similar manner, the material may also be mixed with conventional binders as well as with protective agents against destruction by insects, molds or fire. The material is then compression molded, generally at elevated temperature and pressure. 2. Boards or moldings of veneers, paper or fabrics which are treated as described under 1 and then generally pressed at elevated temperature and pressure. 3. Multilayered boards or moldings of veneers and middle layers in the form of strips or rods, so-called joiner plates, in which the veneers are treated as

described under 1, and then pressed with the middle layers, generally at elevated temperature and pressure.

L Number	Hits	Search Text	DB	Time stamp
1	152	(162/225).CCLS.	USPAT; US-PGPUB	2003/07/03 13:52
2	191	(162/98).CCLS.	USPAT; US-PGPUB	2003/07/03 13:52
3	1	((162/225).CCLS.) and ((162/98).CCLS.)	USPAT; US-PGPUB	2003/07/03 13:52
4	85271	$7board.ti,ab.	USPAT; US-PGPUB	2003/07/03 13:55
5	1074	hemp with (straw or grass or bagasse)	USPAT; US-PGPUB	2003/07/03 13:55
6	657	(fiber or strand or fibrous) with (hemp with (straw or grass or bagasse))	USPAT; US-PGPUB	2003/07/03 13:56
7	87	$7board.ti,ab. and ((fiber or strand or fibrous) with (hemp with (straw or grass or bagasse)))	USPAT; US-PGPUB	2003/07/03 13:56

DOCUMENT-IDENTIFIER: US 20030102650 A1

TITLE: Composite sports **board such as a skateboard** deck

---------- KWIC ---------

Abstract Paragraph - ABTX (1):

A composite material for use as a **skateboard** deck or other sports **board** is disclosed. The composite **skateboard** deck of the preferred embodiment is comprised of two structural layers bonded to and on either side of a light, flexible core. The structural layers made of a strong, resilient material comprised of a natural **fiber**-embedded-matrix, this class of materials including **grasses** such as bamboo, **hemp** and kanaf. The composite **skateboard** deck of the present invention is strong, light, durable, resilient, environmentally friendly, and derived from a more renewable resource with no loss of pop or memory.

Title - TTL (1):

Composite sports **board such as a skateboard** deck

Detail Description Paragraph - DETX (6):

[0020] Referring to FIG. 4, the composite skateboard deck 101 of the preferred embodiment is illustrated in cross section perpendicular to the longitudinal axis 116 (see FIG. 2) to show the constituent layers. The first structural layer 111 and the second structural layer 112 are the primary load-bearing members and support the weight and dynamic forces exerted by the rider. The first and second structural layers are separated by a relatively light, flexible core 113 comprised of one or more plies or layers. According to the present invention, the sports board includes at least one and preferably two or more structural layers constructed from a strong, resilient material of natural fiber-embedded-matrix. This class includes materials having bundles of cellulose fibers running the length of the pole, or culm, embedded in a matrix such as pectin. **Grasses** such as bamboo, **hemp** and kanaf qualify as strong, resilient materials of natural **fiber**-embedded-matrix and are particularly well suited for constructing durable, high-performance sports boards.

EAST Browser - L14: (9) (ret or rett... | US 6137032 A | Tag: S | Doc: 6/9 | Format : KWIC
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	Document ID	Title
4	US 6294191 B1	N-acyl phosphatidylethanolam
5	US 6228652 B1	Method and apparatus for anal
6	US 6137032 A	Xylanase obtained from an an
7	US 6120797 A	N-acyl phosphatidylethanolam

US-PAT-NO: 6137032

DOCUMENT-IDENTIFIER: US 6137032 A

ic fungus

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Brief Summary Text - BSTX (11):

The known applications of xylanases are numerous. For instance, the treatment of forages with xylanases (along with cellulases) to increase the rate of acid production, thus ensuring better quality silage and improvement in the subsequent rate of plant cell wall digestion by ruminants has been described. Xylanases can be used to treat rye, and other cereals with a high arabinoxylan content to improve the digestibility of cereal by poultry and swine. Xylanases can be used in bioconversion involving the hydrolysis of xylan to xylooligosaccharides and xylose which may serve as growth substrates for microorganisms. This could involve simultaneous saccharification and fermentation. Xylanases can be used in biopulping to treat cellulose pulps to remove xylan impurities or to produce pulps with different characteristics. In some cases they can be applied to reduce the amount of chlorine needed to bleach the pulp and reduce the energy needed for refining pulp. Further, xylanases are useful in the retting of flax fibers, the clarification of fruit juices, the preparation of dextrans for use as food thickeners and the production of fluids and juices from plant materials.

US006137032A

United States Patent [19]
Cheng et al.

[11] **Patent Number: 6,137,032**
[45] **Date of Patent: Oct. 24, 2000**

[54] **XYLANASE OBTAINED FROM AN ANAEROBIC FUNGUS**

[75] Inventors: **Kuo-Joan Cheng, Richmond; Leonard Brent Selinger, Lethbridge; Jin-Hao Liu, Calgary, all of Canada; Youji Hu, Gulph Mills, Pa.; Cecil Wallace Forsberg, Guelph, Canada; Maurice Martin Moloney, Calgary, Canada**

[73] Assignee: **Her Majesty the Queen in right of Canada, as represented by the Department of Agriculture and Agri-Food Canada, Lethbridge, Canada**

[21] Appl. No.: **09/390,200**

[22] Filed: **Sep. 7, 1999**

Related U.S. Application Data

[62] Division of application No. 08/749,391, Nov. 13, 1996, Pat. No. 5,948,667.

[51] Int. Cl.[7] **C12N 5/04**

[52] U.S. Cl. **800/288**; 435/200; 435/419; 800/278; 800/306

[58] Field of Search 435/419, 200; 800/278, 288, 306

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Primary Examiner—Charles L. Patterson, Jr.
Attorney, Agent, or Firm—Greenlee, Winner and Sullivan, P.C.

[57] **ABSTRACT**

A xylanase gene, denoted xynC, encoding a novel xylanase (XynC) obtained from the anaerobic fungus *Neocallimastix patriciarum* is provided. The DNA sequence of the xynC gene is also provided. Transformation of microbial and plant hosts with the xynC gene is described. The xynC gene may be used to design probes for use in hybridization experiments to isolate xylanase genes from other anaerobic fungi. The xynC gene has been used to construct an oleosin-xynC expression construct encoding an oleosin-xylanase fusion protein which retains xylanase activity. Transgenic *Brassica napus* (canola), transformed with the oleosin-xynC expression construct, expresses the oleosin-xylanase fusion protein which is immobilized in the oil-body membrane of the *B. napus* seeds. Canola meal, the protein-rich residue left after canola oil is extracted from canola plants, when derived from the transgenic *B. napus* of the present invention, retains substantial xylanase activity, making it an ideal animal feed supplement.

18 Claims, 6 Drawing Sheets

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	Document ID	Title
12	US 6165769 A	Pectin degrading enzymes from
13	US 6124127 A	Pectate lyase
14	US 6066233 A	Method of improving pulp fre
15	US 3649292 A	RECOVERY OF PRODUCTS

US-PAT-NO: 6066233

DOCUMENT-IDENTIFIER: US 6066233 A

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using cellulase and pectinase enzymes

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Brief Summary Text - BSTX (8):

An article by Pommier, Paper Technology, p.50, October 1991, showed use of a cellulase product called Liftase A40 (now called Pergalase.RTM. A40 available from Ciba-Geigy, Greensboro, N.C., 27419) for use in the pulp and paper industry in deinking and refining processes.

Brief Summary Text - BSTX (12):

The use of a combination of enzymes are disclosed in U.S. Pat. No. 4,891,096 to Akkawi and U.S. Pat. No. 5,103,883 to Viikari which describe use of pectinase, hemicellulase and cellulase enzymes in combination for biochemical retting of hemp and for debarking of logs, respectively.

US006066233A

United States Patent [19]

Olsen et al.

[11] **Patent Number: 6,066,233**

[45] **Date of Patent: *May 23, 2000**

[54] **METHOD OF IMPROVING PULP FREENESS USING CELLULASE AND PECTINASE ENZYMES**

[75] Inventors: **William L. Olsen, Warwick, N.Y.; Hui Zhu, Mahwah, N.J.; Martin A. Hubbe, Cambell Hall, N.Y.**

[73] Assignee: **International Paper Company, Purchase, N.Y.**

[*] Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

[21] Appl. No.: **08/911,507**

[22] Filed: **Aug. 14, 1997**

Related U.S. Application Data

[60] Provisional application No. 60/024,086, Aug. 16, 1996.

[51] Int. Cl.[7] D21C 5/02

[52] U.S. Cl. 162/5; 162/72; 435/277; 435/278

[58] Field of Search ..... 162/4, 5, 72 B, 162/158, 189; 435/277, 278

[56] **References Cited**

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WO9218688	10/1992	WIPO D21C 9/10

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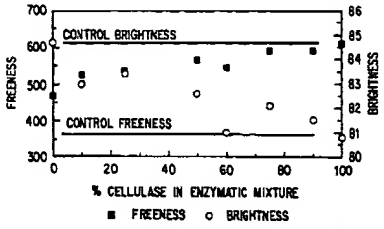
(List continued on next page.)

Primary Examiner—Dean T. Nguyen
Attorney, Agent, or Firm—Ostrager Chong Flaherty & Onofrio

[57] **ABSTRACT**

A method for enhancing the freeness of pulp made from secondary fiber is provided by adding an enzymatic mixture comprised of cellulase and pectinase enzymes to the pulp and treating under conditions to cause a reaction to produce an enzymatically treated pulp. The freeness of the enzymatically treated pulp is increased from the initial freeness of the secondary fiber pulp without a loss in brightness.

15 Claims, 14 Drawing Sheets



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	Title	Kind C
9	Pressure-sensitive adhesive polyacrylat	
10	Filter element	
11	Method of modifying cellulosic wood fi	
12	Adhesive coated dressing and applicato	

US-PAT-NO: 5266250

DOCUMENT-IDENTIFIER: US 5266250 A

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bd fibers and using said fibers for

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As noted above, the superheated oven causes the aqueous binders, applied previously to the fibrous product, to boil and foam. When the bubbles have been formed in the superheated oven, causing non-connecting pores, they afterwards burst and shrink under the temporary or stationary physical form of a skeleton, now having connected pores. Although the effect is not completely understood, it is a fact that the successively more viscous binder --created after bubbling, bursting and shrinking--under the evaporation-shrinkage draws fibers and fiber ends together, thus making firm crossing joints. If the fibers are fibrillated, some fibrils are drawn into the respective fibers and other fibrils to other fibers and other fibrils finally producing a more or less interlocking there-dimensional structure of the fibrous product. This is an enhanced form of binding a fibrous product, whereby the binder links the fibers and their fibrils where they cross each other, preventing an unwanted and costly gluing all over the fibers in a fibrous product, which is the result of some conventional methods.

US005266250A

United States Patent [19]

Kroyer

[11] Patent Number: 5,266,250

[45] Date of Patent: Nov. 30, 1993

[54] METHOD OF MODIFYING CELLULOSIC WOOD FIBERS AND USING SAID FIBERS FOR PRODUCING FIBROUS PRODUCTS

[76] Inventor: Karl K. K. Kroyer, Le Vieux Moulin, 12 rue de la Liberation, 06520, Magagnosc, France

[21] Appl. No.: 747,693

[22] Filed: Aug. 19, 1991

Related U.S. Application Data

[63] Continuation of Ser. No. 520,828, May 9, 1990, abandoned.

[51] Int. Cl.[5] D04H 01/64

[52] U.S. Cl. 264/48.300; 264/51; 264/121; 264/128

[58] Field of Search 264/109, 121, 128, 518, 264/123, 45.3, 45.8, 51; 425/83.1; 106/162, 163.1; 162/157.1, 157.4, 176, 179; 427/180

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4,494,278	1/1985	Kroyer et al.	19/304

Primary Examiner—Jay H. Woo
Assistant Examiner—Robert B. Davis
Attorney, Agent, or Firm—Watson, Cole, Grindle & Watson

[57] ABSTRACT

A method is provided of producing fibrous product from cellulosic wood fiber. First, a layer of this fiber material is deposited on a moving wire. A binding agent in an aqueous solution is then added to the fiber material. Next, the fiber material is moved through a superheated oven having a minimal amount of moving air to cause a lively boiling of the aqueous solution. The fiber material is then dried. In one embodiment, a mixture of alkali treated and acid treated fiber material is deposited on the moving wire.

29 Claims, 1 Drawing Sheet

EAST Browser - L21: (24) 19 and 20 | US 3639199 A | Tag: S,T1 | Doc: 24/24 | Format : KWIC

File Edit View Tools Window Help

	Document ID	Title
22	US 3965229 A	Method of manufacturing a foa
23	US 3880705 A	EXPANDING FIBROUS OR
24	US 3639199 A	REINFORCED LAMINATE

US-PAT-NO: 3639199

DOCUMENT-IDENTIFIER: US 3639199 A

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For instance, by reinforcing two tissue grade papers of basis weight 0.63 oz./yd..sup.2 with two cross-laid layers of fibrillated polypropylene film of tenacity 3 g.p.d., each layer having a basis weight of 0.24 oz./yd..sup.2, bonding the four layers with 0.15 oz./yd..sup.2 of adhesive applied by spraying, calendering the laminate under 10 pounds per lineal inch, the following properties were obtained:

As above indicated, any suitable adhesive may be used. It has been found that with polyethylene or polypropylene as the fibrillated film, BOSTIK SI- 1920, a water-based adhesive from USM Chemical Co. Middleton, Mass. 01949, Jedbon water-based adhesive from Jedco Chemical Corp., 601 North MacQuester Parkwa Mount Vernon, New York 10552, and Hycar (P2100.times.20), a solvent-based adhesive manufactured by B. F. Goodrich were very satisfactory. Normally, a print-type bond will be used wherein the webs are adhered together at spaced locations or the adhesive will be sprayed.

As indicated above, the central reinforcing layer may be formed of one or more fibrillated webs. When a plurality of reinforcing webs are to be used, they may be presecured together or secured to the cellulose layers and then secured together. Cellulose fibers or mixtures of cellulosic and synthetic fibers can be deposited onto the adhesive -covered surface to produce a laminated reinforced nonwoven web of the type contemplated. Such discrete fibers can be deposited on the reinforcing layer by any suitable well-known means, such as by flocking, air-laying or the like.

United States Patent

Brandts et al.

[15] 3,639,199

[45] Feb. 1, 1972

[54] REINFORCED LAMINATE PRODUCT

[72] Inventors: Theodorus Gerardus Brandts; Joseph Alois Lichtenberger, both of Grand Mere, Quebec, Canada; Joseph Maria Bentvelzen, Raleigh, N.C.

[73] Assignee: Consolidated Paper (Bahamas) Limited, Montreal, Quebec, Canada

[22] Filed: Dec. 15, 1969

[21] Appl. No.: 885,201

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 817,927, Apr. 21, 1969, abandoned.

[52] U.S. Cl. 161/57, 15/209, 128/284, 156/85, 156/291, 156/306, 156/309, 161/59, 161/64, 161/148, 161/156, 161/402

[51] Int. Cl. B32b 5/12, B32b 27/10, D04h 1/04

[58] Field of Search 161/55, 57–60, 161/140–143, 146, 148, 156, 79, 82, 84, 85, 64, 402; 264/146, 147; 156/166, 167, 176–179, 290, 291, 85, 306, 309; 15/209; 128/284

[56] References Cited

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3,025,199	3/1962	Harwood	161/85 X
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3,485,705	12/1969	Harmon	161/59

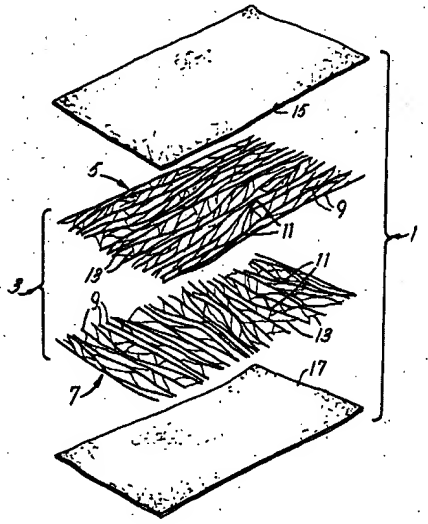
Primary Examiner—William A. Powell

Attorney—Alan Swabey

[57] ABSTRACT

A laminated, nonwoven fabric product and method of making same comprising a central reinforcing web of fibrillated sheet plastic material having a plurality of substantially parallel fibers integrally interconnected at spaced points along their length and outer layers formed of cellulosic material.

7 Claims, 1 Drawing Figure



EAST Browser - L23: (32) 20 and 22 | US.6071994 A | Tag: S.TI | Doc: 7/32 | Format : KWIC

File Edit View Tools Window Help

	Document ID	Title
5	US 6146494 A	Modified cellulosic fibers and
6	US 6121170 A	Water-sensitive compositions
7	US 6071994 A	Formaldehyde-free aqueous b
8	US 6051335 A	Noncircular fiber battery sepa

US-PAT-NO: 6071994

DOCUMENT-IDENTIFIER: US 6071994 A

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The binders of this invention are particularly useful as binders for fiber webs. Examples of fiber webs are webs of cellulose, cellulose acetate, esters and ethers of cellulose, cotton, hemp, animal fibers, such as wool or hairs and especially webs of synthetic or inorganic fibers, eg. aramid, carbon, acrylic, polyester, mineral, PVC or glass fibers.

US006071994A

United States Patent [19]

Hummerich et al.

[11] **Patent Number: 6,071,994**

[45] **Date of Patent: Jun. 6, 2000**

[54] **FORMALDEHYDE-FREE AQUEOUS BINDERS**

[75] Inventors: **Rainer Hummerich**, Worms; **Axel Kistenmacher**, Ludwigshafen; **Walter Denzinger**, Speyer; **Gunnar Schornick**, Neuleiningen; **Bernd Reck**, Grünstadt; **Manfred Weber**, Mannheim, all of Germany

[73] Assignee: **BASF Aktiengesellschaft**, Ludwigshafen, Germany

[21] Appl. No.: **09/125,113**

[22] PCT Filed: **Feb. 19, 1997**

[86] PCT No.: **PCT/EP97/00770**

§ 371 Date: **Aug. 18, 1998**

§ 102(e) Date: **Aug. 18, 1998**

[87] PCT Pub. No.: **WO97/31036**

PCT Pub. Date: **Aug. 28, 1997**

[30] **Foreign Application Priority Data**

Feb. 21, 1996 [DE] Germany 196 06 394

[51] **Int. Cl.**[7] **C08K 3/00**

[52] **U.S. Cl.** **524/247**; 524/249; 524/494

[58] **Field of Search** 324/247, 249, 324/494

[56] **References Cited**

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4,076,917	2/1978	Swift et al. .	
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0 445 578	9/1991	European Pat. Off. .
0 583 086	2/1994	European Pat. Off. .
0 651 088	10/1994	European Pat. Off. .
864 151	1/1953	Germany .
17 20 712	7/1971	Germany .
22 14 450	10/1972	Germany .
23 57 951	5/1975	Germany .
44 08 688	9/1995	Germany .

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Patent Abstracts of Japan, vol. 014, No.220, May 10, 1990, JP Publ. No. 02 051531, Feb. 21, 1990, Appl. No.63200120, Aug. 12, 1988, Koimuma Yasuyoshi, et al, Title: Water-soluble and self-curing polymer and cured product thereof.

Patent Abstracts of Japan, vol. 005, No. 180, Nov. 19, 1981, JP Publ. No. 56 104905, Aug. 21, 1981, Chino yasuyoshi, et al, Title: Production of Novel Modified Resin, Appl. No. 55008500, Jan. 28, 1980.

Primary Examiner—Edward J. Cain

Attorney, Agent, or Firm—Oblon, Spivak, McClelland, Maier & Neustadt, P.C.

[57] **ABSTRACT**

Formaldehyde-free aqueous binders comprise

A) a polymer containing from 5 to [lacuna]% by weight of units derived from an ethylenically unsaturated acid anhydride or from an ethylenically unsaturated dicarboxylic acid whose carboxyl groups can form an anhydride group, and

B) an alkanolamine having at least two hydroxyl groups.

29 Claims, No Drawings

EAST Browser - L23: (32) 20 and 22 | US 5021529 A | Tag: S | Doc: 19/32 | Format: KWIC

File Edit View Tools Window Help

	Document ID	Title
17	US 5441550 A	Post-treatment of laminated no
18	US 5166859 A	Laminated semiconductor cere
19	US 5021529 A	Formaldehyde-free, self-curin
20	US 4879170 A	Nonwoven fibrous hydraulical

US-PAT-NO: 5021529

DOCUMENT-IDENTIFIER: US 5021529 A

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polymers and articles prepared

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When the latex polymer is used as a binder, the fibers may be in the form of nonwoven mats or webs in which they are ordered or are randomly distributed. The web can be formed by carding when the fibers are of such a character, by virtue of length and flexibility, as to be amenable to the carding operation. The fibers may comprise natural textile fibers such as cellulose, jute, sisal, ramie, hemp and cotton, as well as many of the synthetic organic textile fibers including rayon, those of cellulose esters such as cellulose acetate, vinyl resin fibers such as those of polyvinyl chloride and copolymers thereof, polyacrylonitrile and copolymers thereof, polyesters such as poly(ethylene terephthalate), polymers and copolymers of olefins such as ethylene and propylene, condensation polymers such as polyimides or nylon types, and the like. The fibers used can be those of a single composition or mixtures of fibers in a given web.

United States Patent [19]

Garrett

[11] **Patent Number: 5,021,529**

[45] **Date of Patent: Jun. 4, 1991**

[54] **FORMALDEHYDE-FREE, SELF-CURING INTERPOLYMERS AND ARTICLES PREPARED THEREFROM**

[75] Inventor: Robert Y. Garrett, Avon lake, Ohio

[73] Assignee: The BFGoodrich Company, Akron, Ohio

[21] Appl. No.: 595,646

[22] Filed: Oct. 9, 1990

Related U.S. Application Data

[63] Continuation of Ser. No. 402,363, Sep. 5, 1989, abandoned.

[51] Int. Cl.[5] C08F 20/58

[52] U.S. Cl. 526/304; 526/329.3; 526/329.4; 428/500

[58] Field of Search 526/304, 329.3, 329.4; 428/500

[56] References Cited

U.S. PATENT DOCUMENTS

3,231,533 1/1966 Garrett 526/304

Primary Examiner—Paul R. Michl
Assistant Examiner—Thomas McDonald, Jr.
Attorney, Agent, or Firm—Laura P. Shunk

[57] ABSTRACT

An interpolymer that is substantially devoid of formaldehyde and that does not evolve formaldehyde nor decompoces to produce any substantial amount of formaldehyde, is used in the production of impregnated or treated paper, woven and nonwoven fabrics. The interpolymer is produced in latex form by polymerizing in the presence of water, an emulsifier and in initiator, a monomer charge containing at least one polymerizable ethylenically unsaturated monomer and a N-alkylol amide of an alpha, beta ethylenically unsaturated carboxylic acid where the alkylol group contains at least two carbon atoms. Alternatively, the N-alkylol amide can be produced in situ by the reaction of amide of an alpha, beta ethylenically unsaturated carboxylic acid with the corresponding aldehyde to give the desired N-alkylol amide having at least two carbon atoms in the alkylol group.

10 Claims, No Drawings

EAST Browser - L23: (32) 20 and 22 | US 4375718 A | Tag: S | Doc: 24/32 | Format: KWIC
File Edit View Tools Window Help

	Document ID	Title
22	US 4619705 A	Nonionic surfactant treated cle
23	US 4381783 A	Absorbent article
24	US 4375718 A	Method of making fibrous elec
25	US 4327728 A	Catamenial device with an ab

US-PAT-NO: 4375718

DOCUMENT-IDENTIFIER: US 4375718 A

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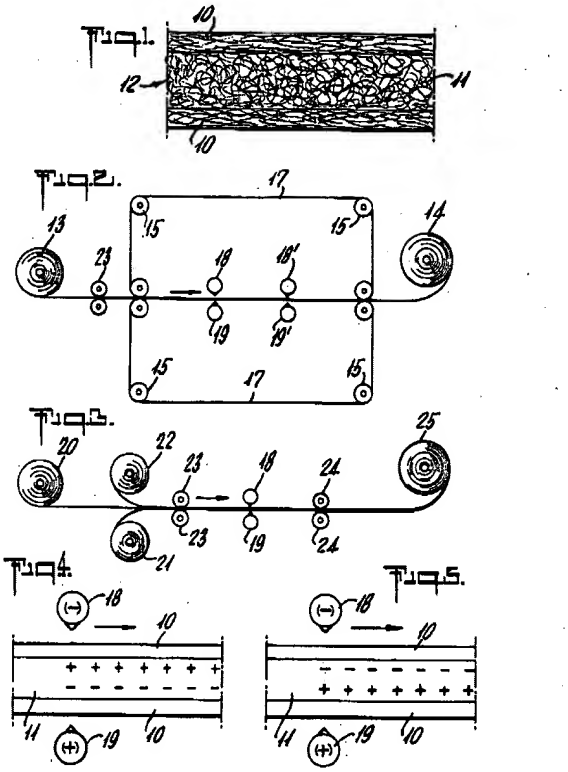
The filtration medium is composed of fibers which have dielectric properties. The contact web, which is in contact with such fibers, is composed of material which will conduct the electrical charge to the dielectric filtration medium. The fibers in the dielectric filtration medium are thermoplastic and are made of a polyolefin such as polypropylene or polyethylene or may be made from polycarbonates or polyhalocarbons. The contact web may be a woven or nonwove web made of cellulosic fiber such as cotton, rayon, woodpulp or hemp or mixtures of these fibers, or may be a nonwoven web made from highly dielectric fibers but bonded together with a conductive binder. The nonwoven webs contain an adhesive binder. The contact web will conduct the electrostatic charge but has poorer dielectric properties than the filtration medium fibers and will not maintain any significant charge.

The contact webs which are used in the present process may be woven or nonwove webs made from cottom, rayon, or mixtures of cotton and rayon with woodpulp or other fibers such as hemp and may contain conductive fibers containing dispersed carbon. These webs, if nonwoven, may be bonded by any conventional, nonwoven bonding system which may employ a hydrophilic or hydrophobic binder. The contact web which is employed in the present process does not maintain the charge which is maintained by the filtration web. The nonwoven contact webs may also be made from non-cellulosic fibers such as polyethylene, polypropylene, polyamide or polyester and bonded with a binder that is conductive so that the conductivity of the contact web is greater than the conductivity of the filtration medium web. The weight of the contact web may vary from 0.3 ounces per square yard to about 6 ounces per square yard.



EAST Browser - L23: (32) 20 and 22 | US 4176108 A | Tag: S | Doc: 28/32 | Format: KWIC

File Edit View Tools Window Help

	Document ID	Title
26	US 4242497 A	Production of amino-silicate c
27	US 4185147 A	Production of amino-silicate c
28	US 4176108 A	Heat-coagulable latex binders
29	US 4106163 A	Apparatus for the dry producti

US-PAT-NO: 4176108

DOCUMENT-IDENTIFIER: US 4176108 A

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rocess for the preparation thereof

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The copolymer latex binder of this invention may be used to prepare chemically bonded, nonwoven fiber material by impregnation of a nonwoven web with the binder. Any fiber which has the required specifications to be formed into a nonwoven web may be used for this purpose. The fibers from which the webs may be made include natural fibers such as cotton, wool, silk, cellulose, sisal, cantala, henequen, hemp, jute and kenaf. Synthetic fibers may also be employed and include rayon; cellulose esters such as cellulose acetate and cellulose triacetate; proteinaceous fibers such as those made from casein; polyamides such as nylon; polyesters such as polyethylene glycol terephthalate; acrylic fibers containing a minimum of about 85% acrylonitrile copolymerized with vinyl chloride, vinyl acetate, vinyl pyridine, methacrylonitrile, or the like and the so-called modacrylic fibers containing smaller amounts of acrylonitrile; vinyl resin fibers such as the copolymer of vinyl chloride and vinyl acetate; fibers obtained from the formal derivatives of polyvinyl alcohol; olefin fibers such as polyethylene and polypropylene; siliceous fibers such as glass and mineral wools; and the like.

United States Patent [19]

Caimi et al.

Best Available Copy

[11] 4,176,108

[45] Nov. 27, 1979

[54] HEAT-COAGULABLE LATEX BINDERS AND PROCESS FOR THE PREPARATION THEREOF

[75] Inventors: Ronald J. Caimi, Somerset; Walter F. Schlauch, Bridgewater, both of N.J.

[73] Assignee: National Starch and Chemical Corporation, Bridgewater, N.J.

[21] Appl. No.: 897,043

[22] Filed: Apr. 17, 1978

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 828,700, Aug. 29, 1977, abandoned.

[51] Int. Cl.² C08K 3/24

[52] U.S. Cl. ..... 260/29.6 TA; 260/29.6 H; 260/29.6 M; 427/381; 427/385 B; 427/389; 427/391; 427/392

[58] Field of Search ..... 260/29.6 H, 29.6 TA; 526/320; 428/290; 427/381, 385 B, 389, 391, 392

[56] References Cited

U.S. PATENT DOCUMENTS

2,923,653	2/1960	Martin	260/29.6 TA
3,231,533	1/1966	Garrett	260/29.6 TA
3,985,929	10/1976	Bonin	428/290
4,045,399	8/1977	Suzuki	260/29.6 TA

Primary Examiner—Paul R. Michl

Attorney, Agent, or Firm—Edwin Szala; Janet E. Hasak

[57] ABSTRACT

An improved latex binder for nonwoven webs comprising an acrylato- and/or vinyl acetate-based copolymer containing 0.1–10% by weight of 2-hydroxyethyl or 2-hydroxypropyl acrylate or methacrylate is prepared by employing in combination with the copolymer 0.2–10% by weight, on latex solids, of anionic surfactant and 0.3–15% by weight, on latex solids, of nonionic surfactant in selected relative proportions and by adding to the copolymer 1–40% by weight, on latex solids, of a water-soluble salt. The resultant binder is characterized by being stable to coagulation at room temperature but coagulable at a temperature between 40° and 85° C. In the preparation of nonwoven fiber material, a nonwoven web is impregnated with the copolymer latex binder, heated to a temperature of within 40° and 85° C. sufficient to coagulate the binder within the web and thus prevent migration, and finally dried to form a chemically bonded, nonwoven fiber material in sheet form.

10 Claims, No Drawings

EAST Browser - L23: (32) 20 and 22 | US 4106163 A | Tag: S | Doc: 29/32 | Format: KWIC

File Edit View Tools Window Help

	Document ID	Title
27	US 4185147 A	Production of amino-silicate c
28	US 4176108 A	Heat-coagulable latex binders
29	US 4106163 A	Apparatus for the dry producti
30	US 4012281 A	Wet laid laminate and method

US-PAT-NO: 4106163

DOCUMENT-IDENTIFIER: US 4106163 A

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non-woven webs

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The constituents of these webs may be fibrous, such as mineral fibres of asbestos, glass, and ceramics, vegetable fibres such as flax and cotton, animal fibres such as wool and silk, organic fibres which may be thermoplastic (polyamide, acrylic . . .), thermo hardenable (polyimide, polyesters . . .) or thermo stable. The particulate constituents may also include particles in granular or powder form, such as particles of resins, in particular thermo-hardenable resins of vulcanised and unvulcanised elastomers, of particles of binding agents: these binding agents may be thermo-hardeneable (for example phenolic resins, modified phenolic resins, epoxy resins, polyester resins), thermoplastic (for example on a base of polyethylene, polystyrene, polypropylene), thermostable (for example polymides) or they may be crude powder elastomers.

United States Patent [19]

Desverchére

[11] **4,106,163**

[45] **Aug. 15, 1978**

[54] **APPARATUS FOR THE DRY PRODUCTION OF NON-WOVEN WEBS**

[75] Inventor: Jean Desverchére, Lyons, France

[73] Assignee: Ceillac, Paris, France

[21] Appl. No.: 709,810

[22] Filed: Jul. 28, 1976

Related U.S. Application Data

[62] Division of Ser. No. 653,665, Jan. 30, 1976.

[30] Foreign Application Priority Data

Mar. 11, 1975 [FR] France 75 08312

[51] Int. Cl.² D04H 1/00

[52] U.S. Cl. 19/296; 19/239

[58] Field of Search 19/155, 156-156.4, 19/239; 264/113, 121, 139; 156/62.2, 62.4, 62.6, 62.8; 425/81-83

[56] References Cited

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2,711,381	6/1955	Novotny et al.	19/156.3 X
2,909,804	10/1959	Means	425/81 X
2,940,134	6/1960	Heritage	19/156.4 X
3,071,822	1/1963	Meller	19/156.3
3,611,508	10/1971	Reinhall et al.	19/156.3

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349,465	11/1960	Switzerland	156/62.4

Primary Examiner—Dorsey Newton

Attorney, Agent, or Firm—Dennison, Dennison, Meserole & Pollack

[57] **ABSTRACT**

A nonwoven uniform web is formed from particulate material and a binding agent in a moving conveyor belt. The material is fed to the belt through a cowl in a random fashion and air is removed from the material; the layer of material is subsequently thinned by a peak removal device and is precalendered, rolled and then heated to activate the binding agent. The resulting web has similar mechanical properties in length direction and width direction, and has a high elastic recovery.

12 Claims, 2 Drawing Figures